

Abstract: Ares I-X Overview

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The Ares I-X flight test is the first development flight of the Ares I crew launch vehicle. This mission, first conceived in 2006, will be launching later in 2009. Its primary mission objectives will be to demonstrate flight and roll control of a dynamically similar vehicle, perform a separation event and measure its shock effects, stack and recover a first stage booster, and demonstrate ground operations. All of the primary flight test vehicle's hardware is at Kennedy Space Center, and is being stacked in the Vehicle Assembly Building for a liftoff at Launch Complex 39B. Mission hardware specific to Ares I-X also is being installed at Launch Complex 39, which has been supporting Space Shuttle operations. This presentation will provide a status and preview of the upcoming mission.



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Ares I-X Overview



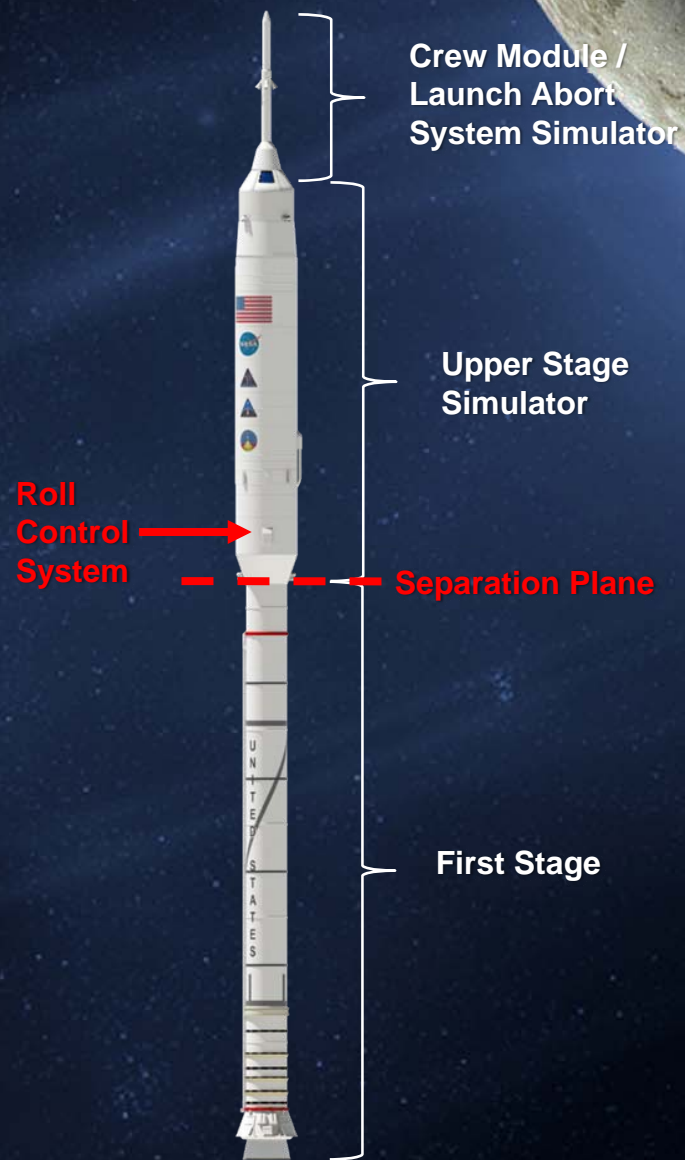
Mission Overview

◆ First development flight test of Ares I crew launch vehicle

- Demonstrate control of a dynamically similar, integrated Ares I/Orion, using Ares I relevant ascent control algorithms
- Perform an in-flight separation/staging event between a Ares I-similar first stage and a representative upper stage
- Demonstrate assembly and recovery of a new Ares I-like first stage element at KSC
- Demonstrate first stage separation sequencing, and quantify first stage atmospheric entry dynamics, and parachute performance
- Characterize magnitude of integrated vehicle roll torque throughout first stage flight

◆ Ares I-X is an uncrewed, suborbital development flight test

◆ Ares I-X will provide opportunity to test ground facilities and operations at NASA's Kennedy Space Center





Mission Profile

P2) Perform in-flight separation/staging event

~ 150,000 feet

~ 150,000 feet

Vehicle Height:	327 feet
Weight at Ignition:	1.8 M-lbm
Max. Acceleration:	2.5 g's
Max. Speed:	Mach 4.7

P4) Demonstrate FS entry dynamics and sequencing of events (parachute deployment, etc.)

P5) Characterize integrated vehicle roll torque

In-flight separation plane

P1) Demonstrate controllability

P3) Demonstrate assembly and recovery of an Ares I similar FS

USS/CM/LAS
Uncontrolled descent and impact

Booster, parachutes and recovery





Flight Test Vehicle

- ◆ **First Stage:** Motor from Space Shuttle inventory delivered to Kennedy Space Center (KSC) in March 2009. Aft skirt and forward structures completed in May 2009. Turned over to System/Ground Operations in June 2009
- ◆ **Upper Stage Simulator (USS):** Hardware completed and delivered to KSC in November 2008
- ◆ **Roll Control System (RoCS):** Modules A and B delivered to KSC April 2009. Installed in the USS interstage
- ◆ **Avionics:** Sensor, harnesses, airborne avionics boxes, and support ground subsystems delivered to KSC except for inertial navigation unit (INU). INU in test
- ◆ **Crew Module/Launch Abort System Simulator:** Hardware completed and delivered to KSC in January 2009





Ground Elements

- ◆ **Ground Operations:** Operational Readiness Reviews November 2008 – August 2009. Stacking of full vehicle in the KSC Vehicle Assembly Building (VAB) started in July 2009
- ◆ **Ground Systems:** Launch Pad modification to be complete August 2009
- ◆ **Launch** scheduled for October 31, 2009



NASA Artist's Rendering





Mission Milestones

- ◆ **Mission planning begun in 2006**
- ◆ **Critical Design Review completed in 2008**
- ◆ **Vehicle hardware delivered to KSC in 2009**
- ◆ **Vehicle stacking completed in August**
- ◆ **Roll out to pad October 29**
- ◆ **Launch October 31**
- ◆ **Final mission report due January 31**

